Some hard facts: Water, the Delta and Drought

Presented to
Lambda Alpha International,
Sacramento Chapter

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Delta Stewardship Council

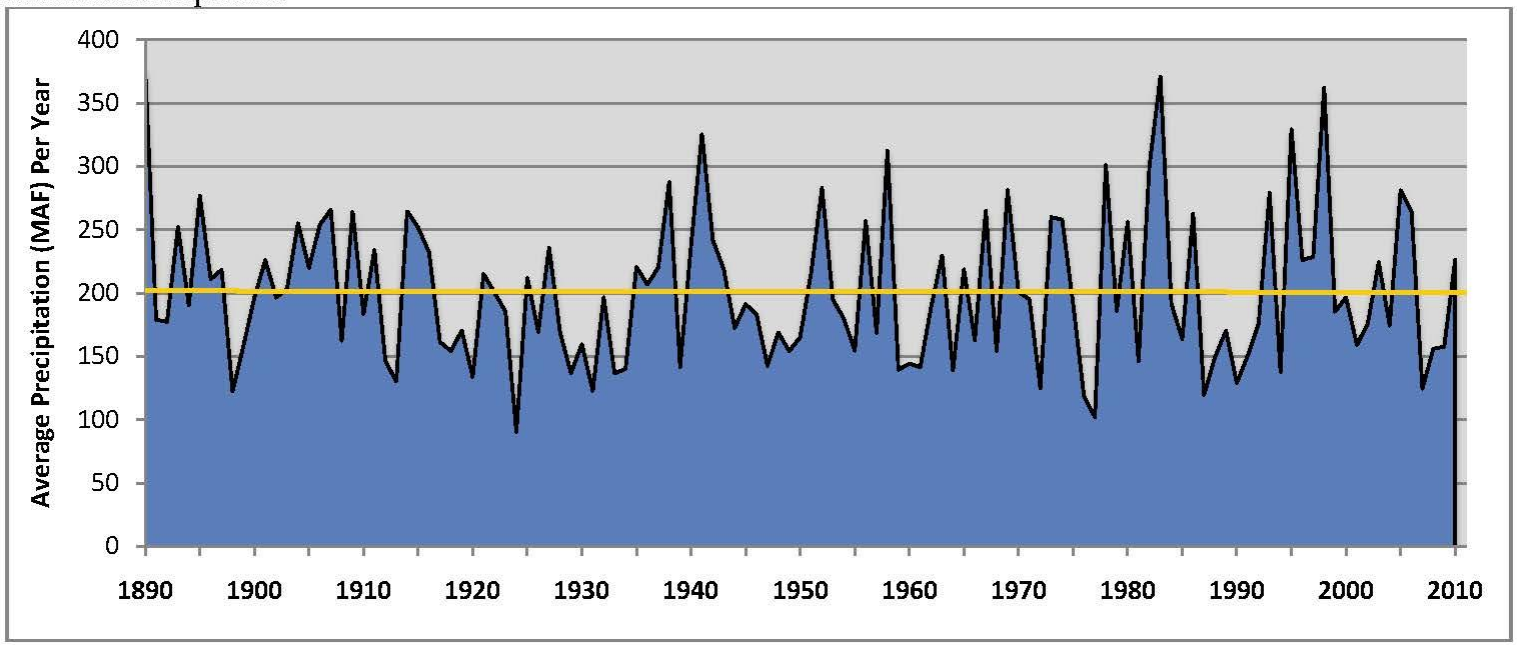
June 24, 2014

DELTA STEWARDSHIP COUNCIL

Rain and snow provides almost 97% of our water

California's Water Supply Is Not Growing And It Arrives Erratically

Historical Precipitation



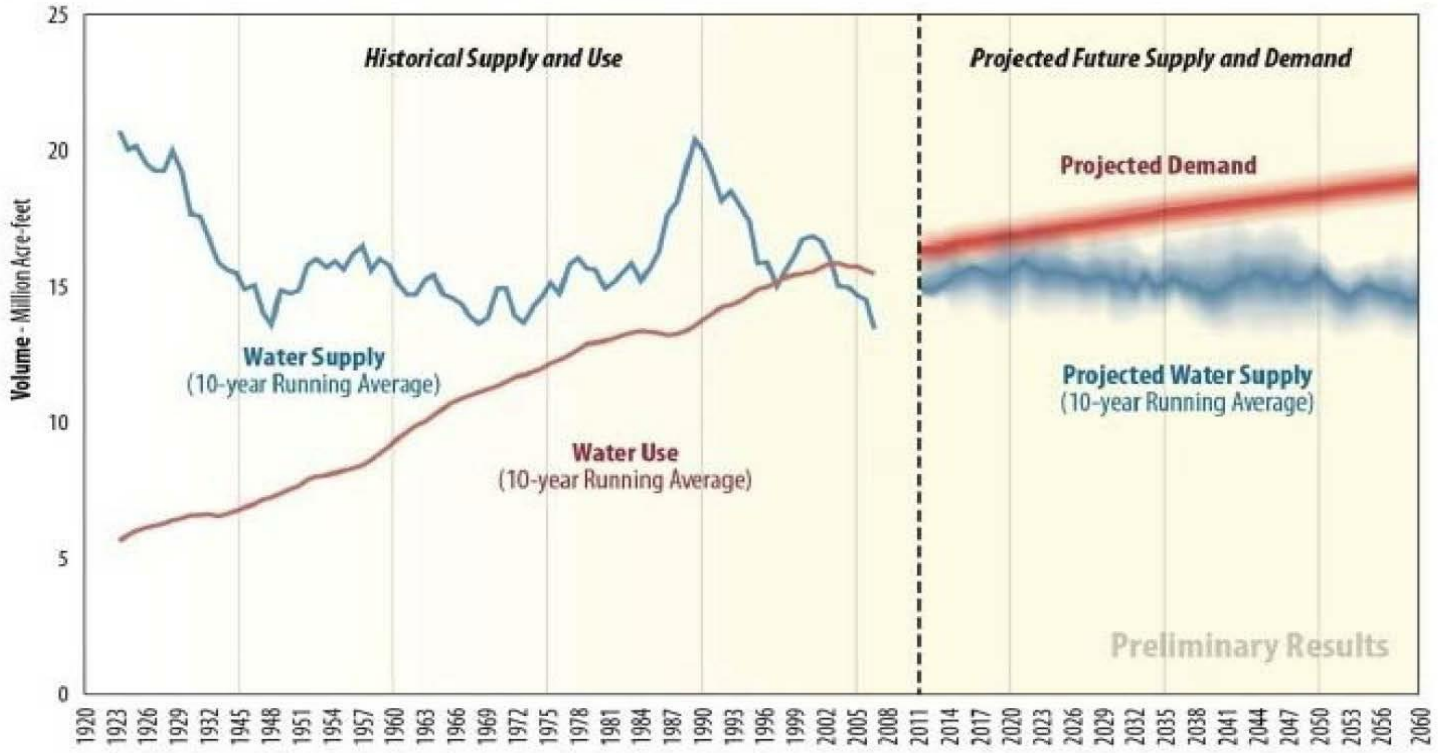
120 year average: 201.3 MAF
Driest 30 year span (1908-1937): 180 MAF
Wettest 30 year span (1977-2006): 210.5 MAF

Source: Delta Stewardship Council. 2012. Sacramento, CA. Adapted from data compiled by Jim Goodridge, state climatologist formerly of DWR, and updated by Michael Anderson, DWR State Climatologist.

Colorado River (the biggest part of the other 3%) has problems, too

FUTURE DEMAND ON THE COLORADO RIVER EXCEEDS WATER SUPPLY

Historical Supply and Use and Projected Future Colorado River Basin Water Supply and Demand



Source: U.S. Bureau of Reclamation. 2011. Colorado River Basin Water Supply and Demand Interim Report No. 1.

Water use in wet/average/dry years

	1998 (171% of normal)[a]		2000 (97% of normal)[a]		2001 (72% of normal)[a]	
Total supply (precipitation & imports)	336.9		194.7		145.5	
Total uses, outflows, & evaporation	331.5		200.4		159.9	
Net storage changes in state	5.5		-5.7		-14.3	
Distribution of dedicated supply (includes reuse) to various applied water uses						
Urban uses	7.8	(8%)	8.9	(11%)	8.6	(13%)
Agricultural uses	27.3	(29%)	34.2	(41%)	33.7	(52%)
Environmental water[b]	59.4	(63%)	39.4	(48%)	22.5	(35%)
Total dedicated supply	**94.5**		**82.5**		**64.8**	

maf = million acre-feet

a. Percent of normal precipitation. Water year 1998 represents a wet year; 2000, average water year; 2001, drier water year.

b. Environmental water includes instream flows, wild and scenic flows, required Delta outflow, and managed wetlands water use. Some environmental water is reused by agricultural and urban water users.

Source: DWR. 2005. California Water Plan 2005. Sacramento, CA.

In dry years, urban and particularly, agricultural water use increases both in absolute numbers and as a proportion of the water available. Water allocated to the environment declines significantly in dry years as human use comes before environmental use.

Some trends are good…but we grow more rapidly than we change

Trends in California's Water Use

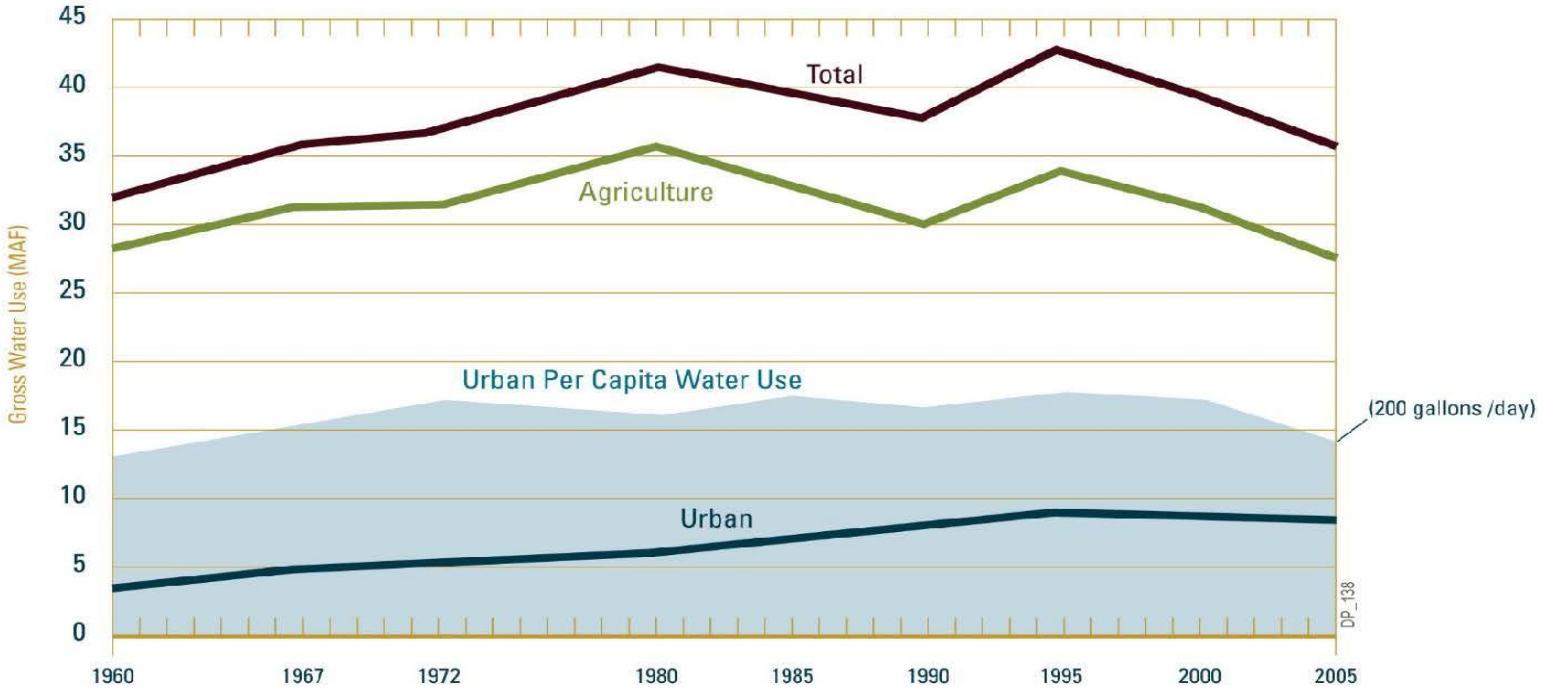


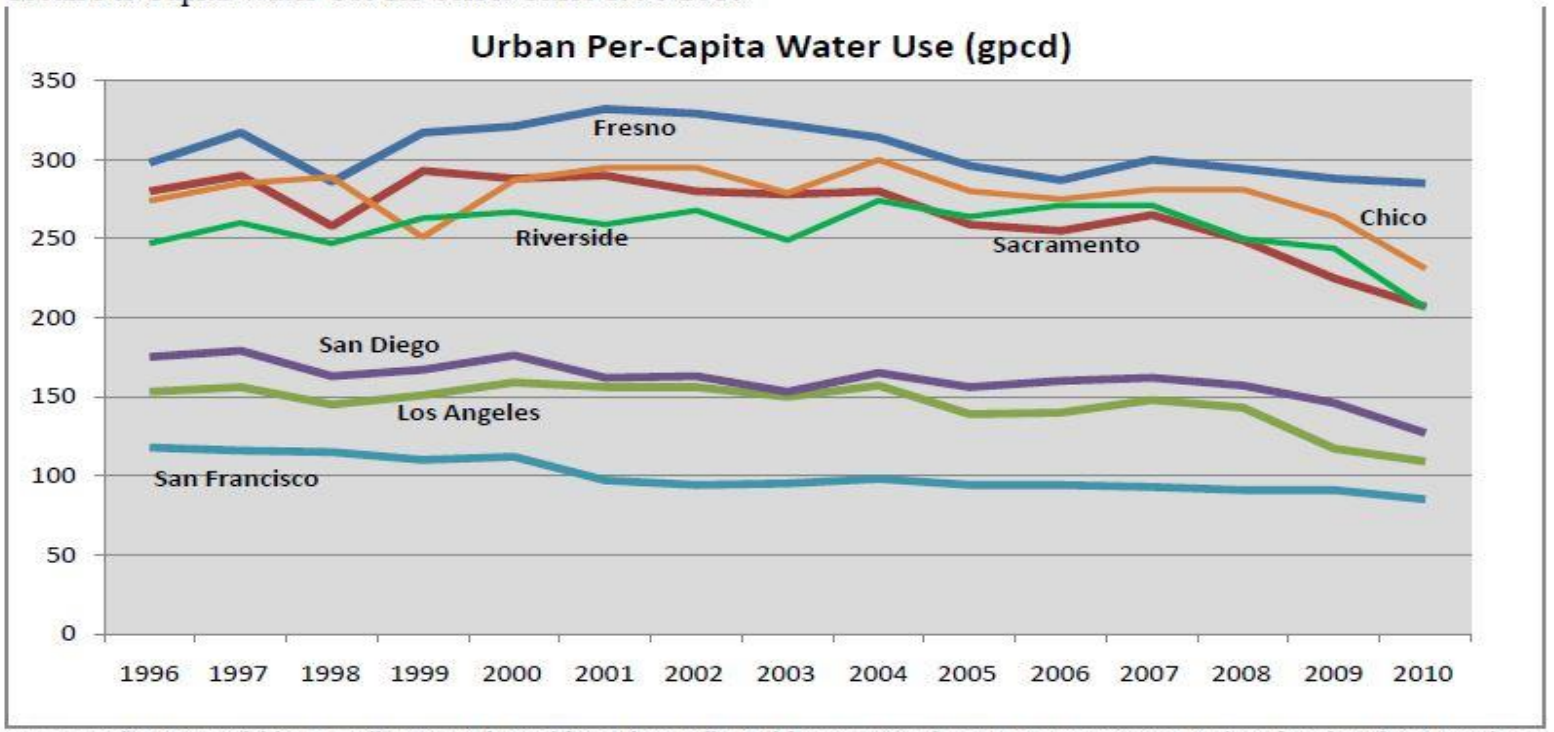
Figure 3-8

California's water use is declining, primarily due to increased water efficiency in both agricultural and urban areas. The City of Los Angeles, like many other cities, reports that it is using the same amount of water as it did over 30 years ago, even though its population has grown by more than 1 million people.

Sources: PPIC, Hanak et. al., 2011; adapted from DWR 2009

Some cities are good at conserving; others, not so much

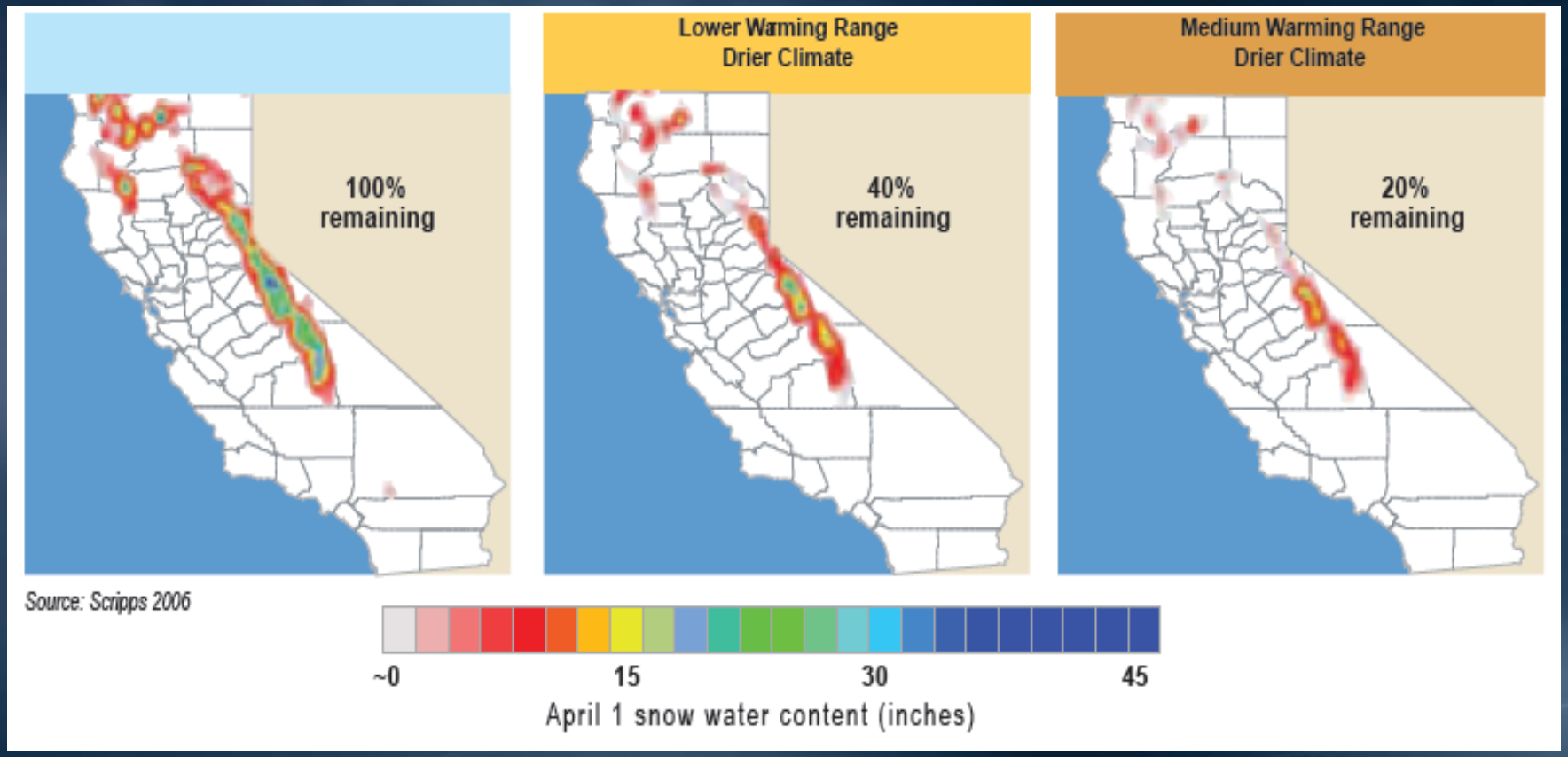
Urban Per Capita Water Use for Select Cities 1996-2010



Source: Delta Stewardship Council. 2012. Adapted from data collected from 2010 Urban Water Management Plans for City of Los Angeles (DWP), City of San Diego, City of Fresno, City of Riverside, California Water UWMP for Chico-Hamilton City District, San Francisco (Prepared by Public Utilities Commission), and the City of Sacramento.

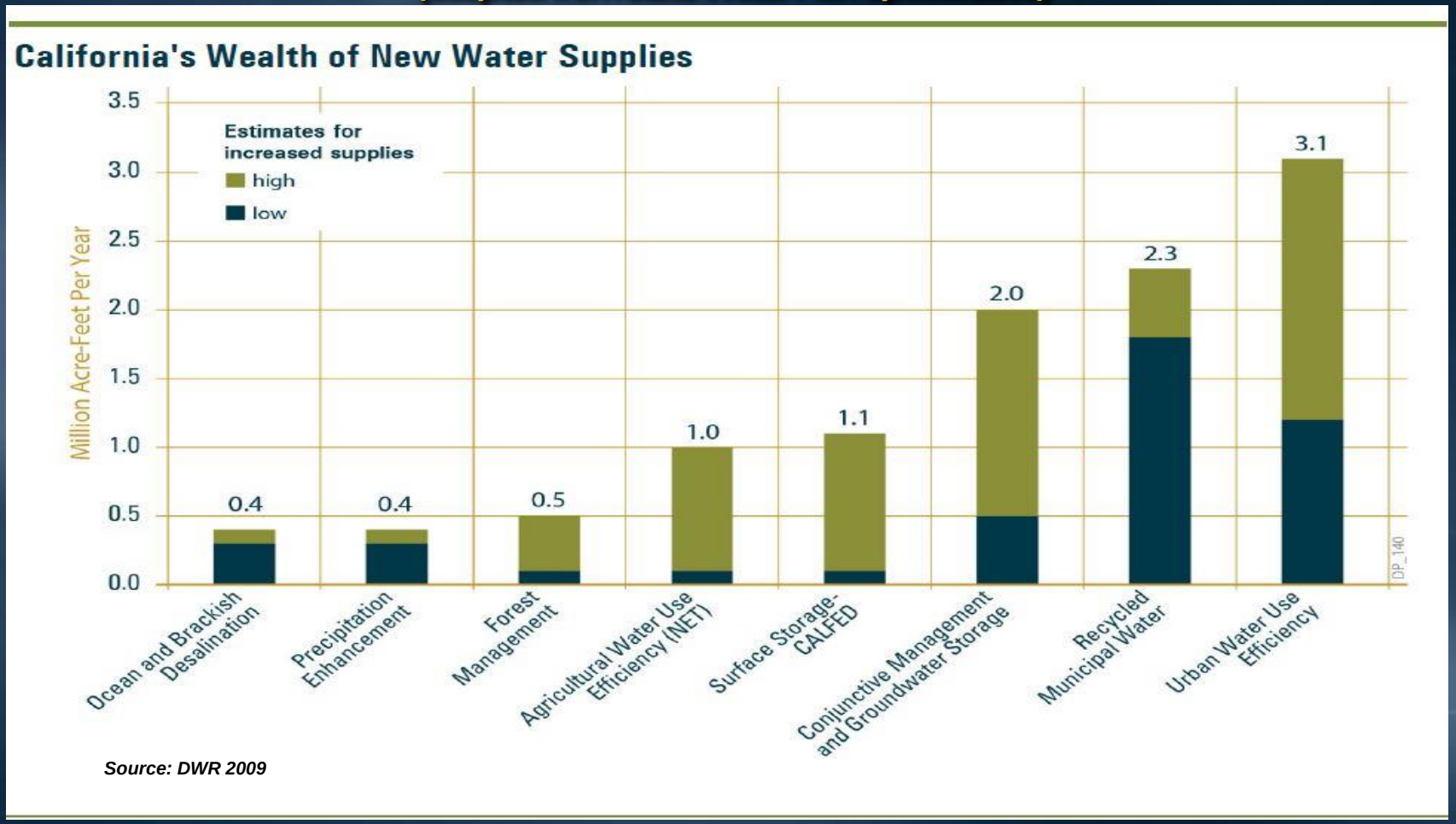
Southland and coastal cities have far lower per capita water use than cities in the Central Valley caused both by conservation and the benefit of a more temperate climate. Conservation success is partly due to increased installation of low flow toilets/appliances, the use of water meters, and voluntary conservation particularly in the commercial and industrial sector. Many urban areas have experienced significant short-term declines in water use with the recent recession, but over the longer term, many local water agencies will likely see a return to higher water use patterns.

Special Problem: Climate change will diminish California snowpack



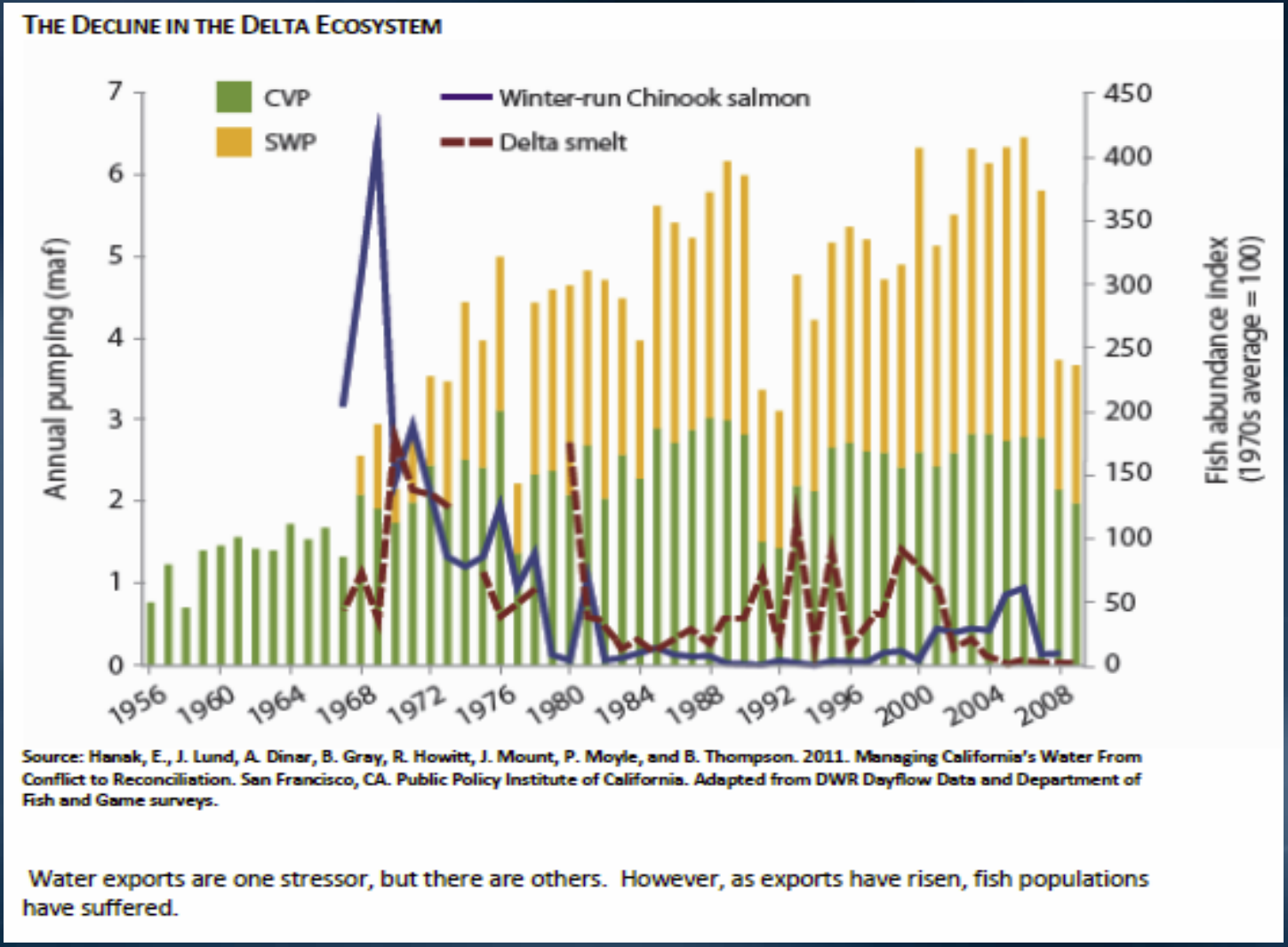
Some ways to increase water supply and reduce demand

(adapted from State Water Plan Update 2009)



Source: DWR 2009

Delta Impacts: Fish

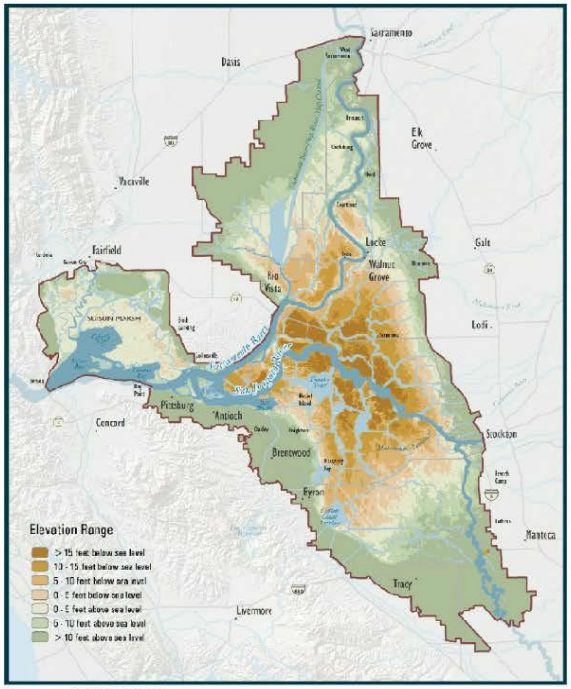


Water exports are one stressor, but there are others. However, as exports have risen, fish populations have suffered.

Delta Impacts: Land subsidence and sea level rise create big problems

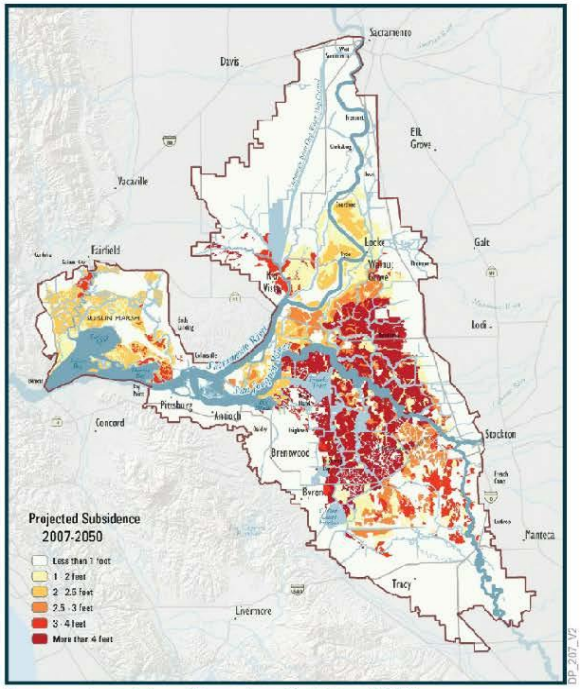
Subsidence in the Delta

Current Delta Elevations



Source: DWR 2009

Projected Subsidence, 2007–2050

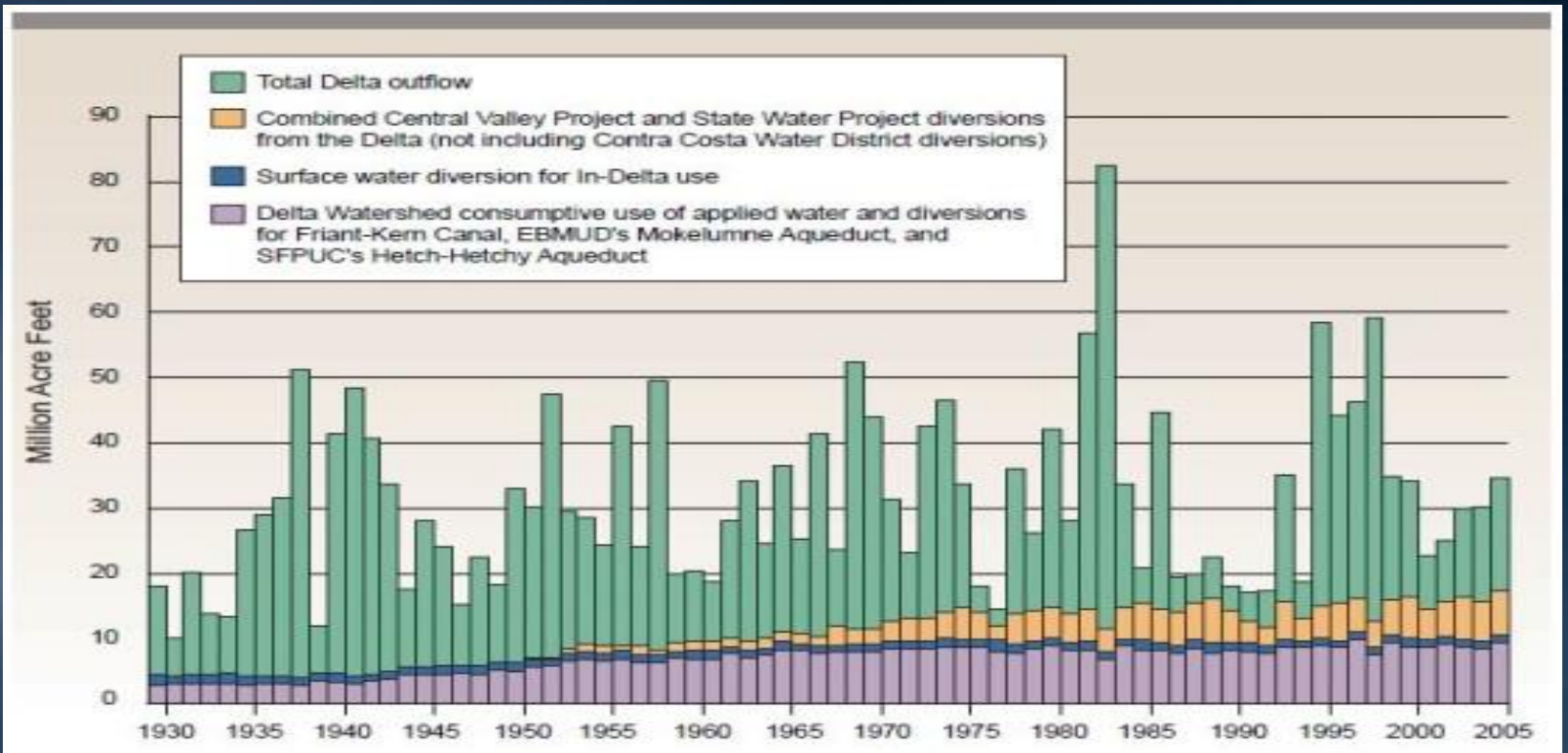


Source: adapted from Deverel and Leighton 2010

Figure 5-4 Oxidation of peat soils through natural processes and human activities has caused the land elevation in the Delta to drop. Much of the central Delta is now at or below sea level. Future subsidence has been projected in these areas. As subsidence progresses, levees must be continually maintained, strengthened, and periodically raised to support increasing hydraulic stress.

Source: Delta Stewardship Council, Delta Plan, 2013

Upsteam, in-Delta Users and Exports Have Reduced Delta Outflows



Source: Delta Blue Ribbon Task Force using measured, calculated and modeled data from an array of data sources as compiled by Tully and Young, Inc., 2007

Trends in Destinations and Uses

Period	Average Annual Total (MAF)	Outflow	in-Delta	Exports	Delta Watershed
1930 to 1949	25.80	81%	5%	0%	14%
1950 to 1969	31.71	67%	4%	4%	24%
1970 to 1989	34.34	51%	5%	15%	29%
1990 to 2005	32.85	48%	4%	17%	31%

Special Problem: San Joaquin Groundwater Overuse

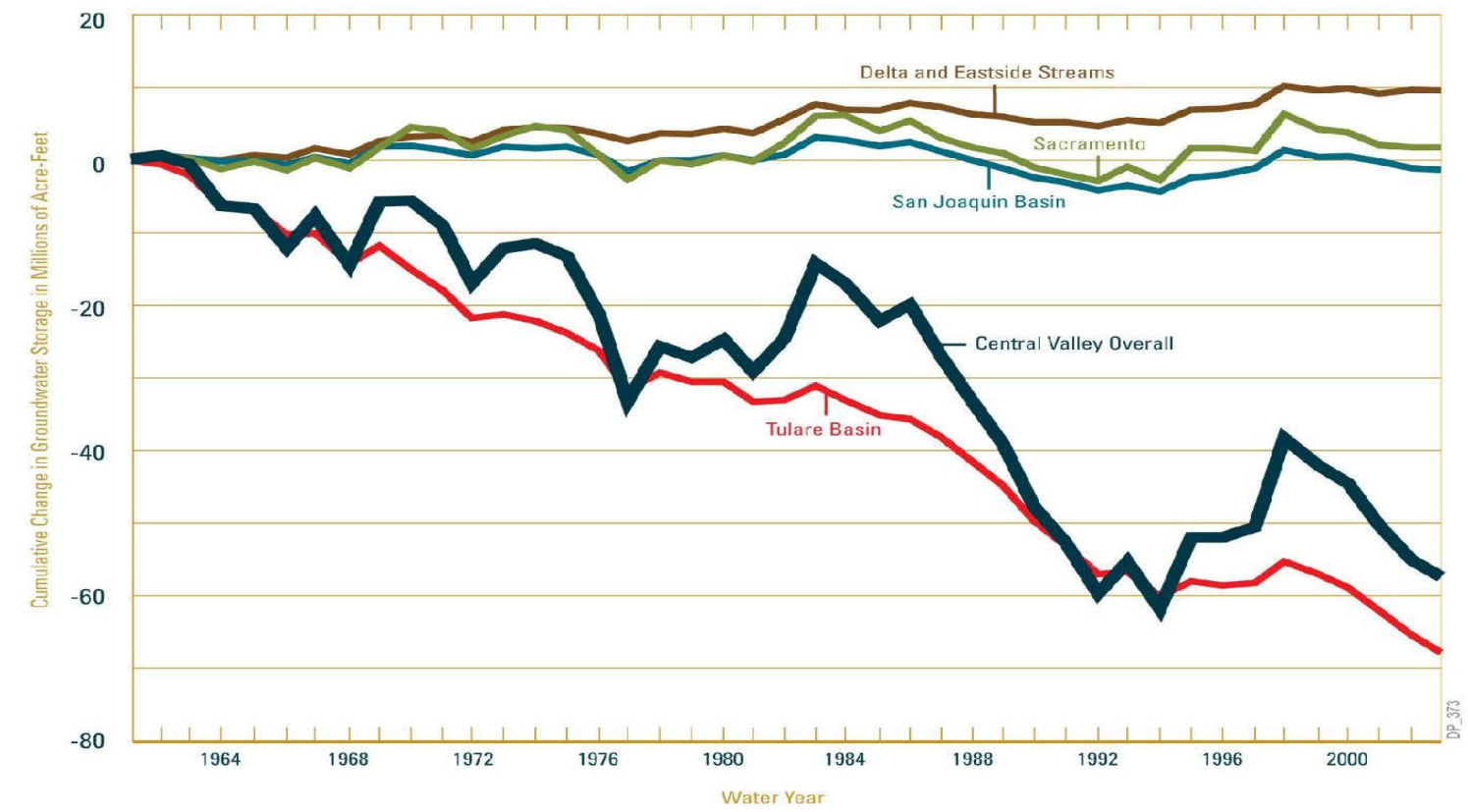


Figure 3-10 Estimated cumulative annual changes in groundwater storage in the Tulare Lake Basin due to over-pumping are more than 60 MAF since 1960. Serious land subsidence and loss of groundwater storage capacity impacts more than half of this region.

Source: Faunt, C.C., ed. 2009 Groundwater Availability of the Central Valley Aquifer, CA: USGS

The drought has hit the Central Valley and small, rural communities the most

46 Local Emergency Proclamations have been received to date from city, county, and tribal governments, as well as special districts

- ***Counties:*** Glenn, Inyo, Kern, Kings, Lake, Madera, Mendocino, Merced, Modoc, Santa Barbara, San Luis Obispo, San Joaquin, Siskiyou, Sonoma, Shasta, Sutter, Tulare, Tuolumne, Yuba, and Mariposa.
- ***Cities:*** Brooktrails Township-Mendocino County, City of Willits-Mendocino County, City of St. Helena-Napa County, City of Calistoga-Napa County, City of American Canyon-Napa County, City of Santa Barbara-Santa Barbara County, City of Montague-Siskiyou County, City of Live Oak-Sutter County, and San Juan Bautista
- ***Tribes:*** Hoopa Valley Tribe in Humboldt County, Yurok Tribe in Del Norte County, Tule River Indian Tribe in Tulare County, Karuk Tribe in Siskiyou/Humboldt Counties, Sherwood Valley Pomo Indian Tribe, Yocha Dehe Wintun Nation
- ***Special Districts:*** Lake Don Pedro Community Services District, Placer County Water Agency (PCWA), Twain Harte Community Services District, Carpinteria Valley Water District, Sonoma County Water Agency, Meiners Oaks Water District, Mariposa Public Utility District, Montecito Water District, Goleta Water District, Tuolumne Utilities District, Nevada Irrigation District

Source: Cal OES (Office of Emergency Services)

UCD Science tell us interesting things

- Eliminating all urban irrigation saves enough water for only 15% of California's agriculture
- Expanding storage capacity (above or below ground) is useless without water to fill it; we are a water-short state
- Reuse of urban wastewater would satisfy only 20% to 30% of urban demand, at considerable expense, often with public angst
- Ocean desalination is expensive and would raise the cost of water for the average California household by about $1,000/year
- Decreasing required river flows for fish and water quality during drought can further disrupt native species and establish new non-native species, leading to additional protections and listings, in turn reducing water available to farms and cities

http://californiawaterblog.com/2014/04/24/a-cheat-sheet-on-the-california-drought/

Questions?

www.deltacouncil.ca.gov